Bidwidth analysis with application to silicon compilation

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This paper introduces Bitwise, a compiler that minimizes the bitwidth the number of bits used to represent each operand for both integers and pointers in a program. By propagating 70 static information both forward and backward in the program dataflow graph, Bitwise frees the programmer from declaring bitwidth invariants in cases where the compiler can determine bitwidths automatically. Because loop instructions comprise the bulk of dynamically executed instructions, Bitw ...

6 Data size optimizations for java programs
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We present a set of techniques for reducing the memory consumption of object-oriented programs. These techniques include analysis algorithms and optimizations that use the results of these analyses to eliminate fields with constant values, reduce the sizes of fields based on the range of values that can appear in each field, and eliminate fields with common default values or usage patterns. We apply these optimizations both to fields declared by the programmer and to implicit fields in the runti ...

Keywords: bitwidth analysis, embedded systems, field externalization, field packing, size optimizations, static specialization